be wide enough to let the maximal Doppler spread and frequency offset pass. The bandwidth filter of the PostCE module 225 can be tailored according to the results of the VE module 122 and is thusly narrower than the bandwidth of the PreCE module 220, improving PostCE 225 performance.

[0028] The output of the Rake Fingers module 115 can be expressed as

$$U_0(n) = d\, A_0\, e^{j(\Delta\omega + \theta_0)} + i_0$$

(Equation 1)

[0029] where d is the data symbol, A_0 is the channel amplitude gain, θ_0 is the channel phase gain, $\Delta\omega$ is the frequency offset, and i_0 is the noise. It can also be assumed that the output of the PreCE module 220 is

$$U_1(n) = d\, A_1\, e^{j(\Delta\omega + \theta_1)} + i_1$$

(Equation 2)

[0030] where A_1 is the estimated version of channel amplitude gain, θ_1 is the estimated version of channel phase gain, and i_1 is the noise. These estimations are done in the PreCE module 220. The rough complex gain $U_1(n)$ is sent

to the AFC 125 to generate the compensating signal given in equation 3.

[0031]

$$U_2(n) = e^{-j(\Delta\omega + \theta_2)}$$

(Equation 3)

[0032] The phase noise and steady-state error are lumped into phase jitter θ_2. The signal $U_1(n)$ is mixed with $U_2(n)$ and produces

$$U_3(n) = A_1 e^{j(\theta_1 - \theta_3)} + i_1$$

(Equation 4).

[0033] Note that $e^{\Delta\omega\ n}$ is removed from the equation. This insures that the signal $U_3(n)$ can properly pass through the PostCE module 225. The signal $U_3(n)$ is also sent to the VE module 122. The VE module 122 estimates the velocity of the mobile unit relative to a base station and the bandwidth of the PostCE module 225 is adjusted accordingly.

[0034] The signal

$$U_4(n) = A_1 e^{j(\theta_1 - \theta_3 + \theta_4)} + i_0$$

(Equation 5)

[0035] results from passing $U_3(n)$ through the PostCE module

225, where θ_4 is the phase response of the PostCE module 225. The out-of-band noise is suppressed. The MRC module 118 inputs $U_0(n)$ and $U_4(n)$ to perform phase and amplitude compensation with the multipath signals combined to produce

$$U_5(n) = \Sigma\, d\, A_0\, A_1\, e^{j(\Delta\omega + \theta_0 - \theta_1 + \theta_3 - \theta_4)} + i_5$$

(Equation 6).

[0036] Assuming an estimation of channel phase gain is $\Delta\theta=\theta_0-\theta_1$, the signal $U_5(n)$ can also be expressed as

$$U_5(n) = \Sigma\, d\, A_0\, A_1\, e^{j(\Delta\omega + \Delta\theta + \theta_3 - \theta_4)} + i_5$$

(Equation 7).

[0037] The mixer 235 then produces the final results

$$U_6(n) = \Sigma\, d\, A_0\, A_1\, e^{j(\Delta\theta - \theta_4)} + i_6$$

(Equation 8).

[0038] If the noise term i_6 in equation 8 is ignored, only the CE error remains and the frequency offset is removed. Note that the phase noise of the AFC 125, θ_2, is also removed. The signals pass though the blocks with precisely tailored bandwidth and no feedback loops exist between the